PARTITIONED MEDIUM ACCESS CONTROL

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. provisional application Ser. No. 60/377,679, filed May 3, 2002, entitled "Exposable Intra-MAC Interface For Wireless LANs," (Attorney Docket: 680-038us), which is also incorporated by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to telecommunications in general, and, more particularly, to a novel medium access control architecture.

BACKGROUND OF THE INVENTION

[0003] **FIG. 1** depicts a schematic diagram of a wireless local area network in the prior art, which comprises: station **101-1**, station **101-2**, and station **101-3**. Before stations **101-1**, **101-2**, and **101-3** can communicate with each other, there must be an agreement between the stations as to the meaning of the signals that they transmit. For example, the stations must agree on who talks when, what constitutes a "0" and a "1," how is an error detected and corrected, etc. In the terminology of telecommunications, this agreement is called a protocol.

[0004] In a local area network a communications channel is shared among the stations such that if two or more of the stations transmit messages simultaneously via the shared channel, the messages can become corrupted. Consequently, a local area network protocol must include a mechanism for ensuring that only one station at a time can transmit into the shared-communications channel. This mechanism, which is known as a Medium Access Control, might also provide additional services such as encryption, authentication, and quality of service (QoS) provisioning, as well as management of certain non-communication functions such as power conserving operational states.

SUMMARY OF THE INVENTION

[0005] In wireless local area networks that conform to the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standard, the Medium Access Control is theoretically decoupled from the mechanism for controlling the physical (i.e., radio) transmission and receipt of message signals (referred to throughout this specification as the "Physical Control") but in practice the two are inextricably intertwined.

[0006] The present invention enables the partial decoupling of the Medium Access Control from the Physical Control. This is especially advantageous for IEEE 802.11 wireless networks because it enables the standardization, development, and implementation of some of the medium-access-control services to be decoupled from the standardization, development, and implementation of the Physical Control, while maintaining full compatibility with the installed base of existing 802.11 equipment. This decoupling can result in the savings of tens or hundreds of millions of dollars to semiconductor, computer, and networking companies.

[0007] In particular, the illustrative embodiment decouples some of the medium-access-control services from the Physical Control by bifurcating the Medium Access Control into (i) an Upper Medium Access Control that provides those medium-access-control services that are independent of the Physical Control, and (ii) a Lower Medium Access Control that provides those medium-access-control services that are dependent on the Physical Control.

[0008] Although in this specification the illustrative embodiment is disclosed in the context of IEEE 802.11 local area networks, it will be clear to those skilled in the art how to make and use alternative embodiments of the present invention—including wireline networks and wireless networks—that employ protocols other than IEEE 802.11 (e.g., IEEE P802.15.3, etc.).

[0009] The illustrative embodiment comprises: receiving a service data unit at an Upper Medium Access Control; and outputting a protocol data unit to a Lower Medium Access Control; wherein said protocol data unit is based on: (i) said service data unit, and (ii) a first medium-access-control service that is independent of the state of a Physical Control providing service to said Lower Medium Access Control; and wherein said Lower Medium Access Control provides a second medium-access-control service based on: (i) said protocol data unit, and (ii) the state of said Physical Control.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] **FIG. 1** depicts a schematic diagram of wireless local area network **100** in accordance with the prior art.

[0011] **FIG. 2** depicts a conceptual architectural diagram of wireless station **101-*i***, as shown in **FIG. 1**, in accordance with the prior art.

[0012] **FIG. 3** depicts a conceptual architectural diagram of a wireless station in accordance with the illustrative embodiment of the present invention.

[0013] **FIG. 4** depicts a data-flow diagram of the illustrative embodiment of the present invention.

[0014] **FIG. 5** depicts a block diagram of the salient components of Upper Medium Access Control **310**, as shown in **FIG. 3**, in accordance with the illustrative embodiment of the present invention.

[0015] **FIG. 6** depicts a device/control mapping for a wireless station in accordance with the illustrative embodiment of the present invention.

[0016] **FIG. 7** depicts a block diagram of the salient components of Lower Medium Access Control **320**, as shown in **FIG. 3**, in accordance with the illustrative embodiment of the present invention.

DETAILED DESCRIPTION

[0017] **FIG. 2** depicts a conceptual architectural diagram of wireless station **101**-i in accordance with the prior art. As shown in **FIG. 2**, wireless station **101**-i comprises Logical Link Control (LLC) **210**, Medium Access Control **220**, and Physical Control **230**, interconnected as shown.

[0018] Logical Link Control (LLC) **210** performs a variety of tasks such as multiplexing of packets from and demultiplexing of packets to a plurality of network layer entities with transfer of said packets occurring over the single data